

In the Claims

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-6. (cancelled)

7. (currently amended) A support arm, comprising:

a first strut having a proximal portion;

a proximal link pivotally coupled to the proximal portion of the first strut at a first proximal joint, the proximal link comprising a cam, wherein the first strut is rotatable relative to the cam about the first proximal joint;

a distal link pivotally coupled to a distal portion of the first strut at a first distal joint, wherein the first strut is rotatable relative to the distal link about the first distal joint; and

a cam follower coupled to the first strut, the cam follower contacting a cam surface of the cam at a first contact point; the cam and the cam follower cooperating to apply a cam moment to the first strut; and the cam moment being sufficient to balance a load supported by the distal link, further comprising a means for urging the cam follower against the cam surface of the cam wherein the means for urging the cam follower against the cam surface of the cam comprises a spring, and further comprising an adjustment mechanism for varying a characteristic of the spring. The support arm of claim 6, wherein the adjustment mechanism comprises a spring plate coupled to the spring.

8. (original) The support arm of claim 7, wherein the adjustment mechanism comprises a screw for adjusting a position of the spring plate.

9. (original) The support arm of claim 8, wherein the screw threadingly engages a threaded portion of the spring plate.

10. (cancelled)

11. (currently amended) The support arm of claim 20 [[10]], wherein the cam moment varies as a function of a trigonometric SIN of the strut angle when the first strut rotates relative to the cam.

12. (original) The support arm of claim 11, wherein the cam moment varies in proportion to a trigonometric SIN of the strut angle when the first strut rotates relative to the cam.

13-19. (canceled)

20. (Currently Amended) A support arm, comprising:
a first strut having a proximal portion;
a proximal link pivotally coupled to the proximal portion of the first strut at a first proximal joint, the proximal link comprising a cam, wherein the first strut is rotatable relative to the cam about the first proximal joint;

a distal link pivotally coupled to a distal portion of the first strut at a first distal joint, wherein the first strut is rotatable relative to the distal link about the first distal joint; and a cam follower coupled to the first strut, the cam follower contacting a cam surface of the cam at a first contact point; the cam and the cam follower cooperating to apply a cam moment to the first strut; and the cam moment being sufficient to balance a load supported by the distal link, wherein a strut angle is defined by a longitudinal axis of the first strut and a direction of gravitational pull, a contact angle is defined by a line that is perpendicular to the longitudinal axis of the first strut and a tangent line that is generally tangent to both the cam follower and the cam surface and that extends through the first contact point, the cam provides a reaction force supporting the cam follower when the cam follower is urged against the cam, the cam moment is provided by a moment creating component of the reaction force, and The support arm of claim 19, wherein the cam is shaped so that the moment creating component of the reaction force varies as the first strut rotates relative to the cam.

21. (currently amended) The support arm of claim 20 [[19]], wherein the moment creating component of the reaction force varies as a function of the contact angle as the first strut rotates relative to the cam.

22. (currently amended) The support arm of claim 20 [[18]], wherein the cam is shaped so that the contact angle varies as the first strut rotates relative to the cam.

23. (original) The support arm of claim 22, wherein the cam is shaped so that a trigonometric TAN function of the contact angle varies as a function of a trigonometric SIN of the strut angle when the first strut rotates relative to the cam.

24. (currently amended) A support arm, comprising:
a first strut having a proximal portion;
a proximal link pivotally coupled to the proximal portion of the first strut at a first proximal joint, the proximal link comprising a cam, wherein the first strut is rotatable relative to the cam about the first proximal joint;
a distal link pivotally coupled to a distal portion of the first strut at a first distal joint, wherein the first strut is rotatable relative to the distal link about the first distal joint; and
a cam follower coupled to the first strut, the cam follower contacting a cam surface of the cam at a first contact point; the cam and the cam follower cooperating to apply a cam moment to the first strut; and the cam moment being sufficient to balance a load supported by the distal link.
~~The support arm of claim 1,~~ wherein the cam is shaped so that a deflection of a spring varies as the first strut rotates relative to the cam.

25. (original) The support arm of claim 24, wherein the deflection of the spring varies as a function of a trigonometric SIN of the strut angle when the first strut rotates relative to the cam.

26. (currently amended) A support arm, comprising:
a first strut having a proximal portion;

a proximal link pivotally coupled to the proximal portion of the first strut at a first proximal joint, the proximal link comprising a cam, wherein the first strut is rotatable relative to the cam about the first proximal joint;

a distal link pivotally coupled to a distal portion of the first strut at a first distal joint, wherein the first strut is rotatable relative to the distal link about the first distal joint; and

a cam follower coupled to the first strut, the cam follower contacting a cam surface of the cam at a first contact point; the cam and the cam follower cooperating to apply a cam moment to the first strut; and the cam moment being sufficient to balance a load supported by the distal link.
~~The support arm of claim 1,~~ wherein the cam is shaped so that a radius of the cam varies when the first strut rotates relative to the cam.

27. (previously presented) The support arm of claim 26, wherein the cam is shaped so that the radius of the cam varies as a function of a trigonometric SIN of the strut angle when the first strut rotates relative to the cam.

28. (currently amended) A support arm, comprising:

a first strut having a proximal portion;

a proximal link pivotally coupled to the proximal portion of the first strut at a first proximal joint, the proximal link comprising a cam, wherein the first strut is rotatable relative to the cam about the first proximal joint;

a distal link pivotally coupled to a distal portion of the first strut at a first distal joint, wherein the first strut is rotatable relative to the distal link about the first distal joint; and

a cam follower coupled to the first strut, the cam follower contacting a cam surface of the cam at a first contact point; the cam and the cam follower cooperating to apply a cam moment to the first strut; and the cam moment being sufficient to balance a load supported by the distal link.
The support arm of claim 1, wherein the cam is shaped so that a radius of curvature of the cam varies when the first strut rotates relative to the cam.

29. (original) The support arm of claim 28, wherein the cam is shaped so that a radius of curvature of the cam varies as a function of a trigonometric SIN of the strut angle when the first strut rotates relative to the cam.

30. (currently amended) The support arm of claim 20 [[13]], wherein the cam is shaped such that the contact angle changes when the first strut is rotated relative to the cam.

31. (currently amended) The support arm of claim 28 [[1]], wherein a spring is extended as the first strut rotates so that the first distal joint moves in a downward direction.

32. (currently amended) The support arm of claim 28 [[1]], wherein a spring is compressed as the first strut rotates so that the first distal joint moves in a downward direction.

33. (original) The support arm of claim 32, wherein the spring comprises a coil spring.

34-37. (cancelled)

38. (currently amended) The support arm of claim 28 [[1]], wherein the cam surface has a substantially continually changing slope.

39. (currently amended) A support arm, comprising:
a first strut having a proximal portion;
a proximal link pivotally coupled to the proximal portion of the first strut at a first proximal joint, the proximal link comprising a cam, wherein the first strut is rotatable relative to the cam about the first proximal joint;
a distal link pivotally coupled to a distal portion of the first strut at a first distal joint, wherein the first strut is rotatable relative to the distal link about the first distal joint; and
a cam follower coupled to the first strut, the cam follower contacting a cam surface of the cam at a first contact point; the cam and the cam follower cooperating to apply a cam moment to the first strut; and the cam moment being sufficient to balance a load supported by the distal link,
~~The support arm of claim 1,~~ wherein the cam surface has a substantially continually changing radius of curvature.

40. (currently amended) A support arm, comprising:
a first strut having a proximal portion;
a proximal link pivotally coupled to the proximal portion of the first strut at a first proximal joint, the proximal link comprising a cam, wherein the first strut is rotatable relative to the cam about the first proximal joint;

a distal link pivotally coupled to a distal portion of the first strut at a first distal joint,
wherein the first strut is rotatable relative to the distal link about the first distal joint; and

a cam follower coupled to the first strut, the cam follower contacting a cam surface of the
cam at a first contact point; the cam and the cam follower cooperating to apply a cam moment to
the first strut; and the cam moment being sufficient to balance a load supported by the distal link,
~~The support arm of claim 1,~~ wherein the cam has a substantially continually changing radius.

41. (canceled)

42. (currently amended) The support arm of claim 40 ~~[[1]]~~, further comprising a second strut having a proximal portion pivotally coupled to the proximal link at a second proximal joint and a distal portion pivotally coupled to the distal link at a second distal joint, wherein the first strut, the second strut, the proximal link, and the distal link form a parallelogram.

43. (canceled)

44. (currently amended) A support arm, comprising:
a first strut having a proximal portion;
a proximal link pivotally coupled to the proximal portion of the first strut at a first
proximal joint, the proximal link comprising a cam, wherein the first strut is rotatable relative to
the cam about the first proximal joint;

a distal link pivotally coupled to a distal portion of the first strut at a first distal joint, wherein the first strut is rotatable relative to the distal link about the first distal joint; and

a cam follower coupled to the first strut, the cam follower contacting a cam surface of the cam at a first contact point; the cam and the cam follower cooperating to apply a cam moment to the first strut; and the cam moment being sufficient to balance a load supported by the distal link, further comprising a means for urging the cam follower against the cam surface of the cam wherein the means for urging the cam follower against the cam surface of the cam comprises a spring, and further comprising an adjustment mechanism for varying a characteristic of the spring The support arm of claim 6, wherein the adjustment mechanism varies a pre-load of the spring.

45. (cancelled)

46. (currently amended) A support arm, comprising:

a first strut having a proximal portion;

a proximal link pivotally coupled to the proximal portion of the first strut at a first proximal joint, the proximal link comprising a cam, wherein the first strut is rotatable relative to the cam about the first proximal joint;

a distal link pivotally coupled to a distal portion of the first strut at a first distal joint, wherein the first strut is rotatable relative to the distal link about the first distal joint; and

a cam follower coupled to the first strut, the cam follower contacting a cam surface of the cam at a first contact point; the cam and the cam follower cooperating to apply a cam moment to the first strut; and the cam moment being sufficient to balance a load supported by the distal link,

further comprising a means for urging the cam follower against the cam surface of the cam
wherein the means for urging the cam follower against the cam surface of the cam comprises a
spring, and further comprising an adjustment mechanism for varying a characteristic of the
spring The support arm of claim 6, wherein the adjustment mechanism varies a length of the
spring.